Supplementary Information

Tree height and hydraulic traits shape growth responses across droughts in a temperate broadleaf forest

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While there were several R-packages we used for a specific purpose in our methods, numerous packages were immensely helpful for this research behind the scenes. As in all of science, this study is a representation of the work done by both the authors of this paper as well as countless others. While acknowledging everyone is impossible, we want to at least give thanks to those who made this work possible.

R-packages not already cited in the main manuscript include the following, listed alphabetically by corresponding package name:

(R Core Team 2019; Robinson and Hayes 2020; Fox, Weisberg, and Price 2019; Wilke 2019; Dowle and Srinivasan 2019; Wickham, Hester, and Chang 2020; Bunn et al. 2019; Wickham, François, et al. 2020; Winston Chang 2014; Wickham, Chang, et al. 2019; Kassambara 2020; Arnold 2019; Auguie 2017; Xie 2020; Spinu, Grolemund, and Wickham 2018; Barton 2019; Lefcheck, Byrnes, and Grace 2019; Urbanek 2013; Henry and Wickham 2019; Hijmans 2020; Perpinan Lamigueiro and Hijmans 2019; Temple Lang 2020; Wickham and Bryan 2019; Wickham 2017, 2019; Bivand, Keitt, and Rowlingson 2019; Bivand and Rundel 2019; Allaire et al. 2020; Pebesma 2020; Gagolewski et al. 2020; Wickham and Henry 2020)

Table S1: Species-specific bark thickness regression equations

Species	Equations	r.2
Carya cordiformis	ln[B]=-1.56+0.416*ln[DBH]	0.226
Carya glabra	ln[B]=-0.393+0.268*ln[DBH]	0.040
Carya ovalis	ln[B]=-2.18+0.651*ln[DBH]	0.389
Carya tomentosa	ln[B]=-0.477+0.301*ln[DBH]	0.297
Fagus grandifolia	ln[B]=1*ln[DBH]	
Fraxinus americana	ln[B]=0.418+0.268*ln[DBH]	0.256
Juglans nigra	ln[B]=0.346+0.279*ln[DBH]	0.246
Liriodendron tulipifera	ln[B]=-1.14+0.463*ln[DBH]	0.545
Quercus alba	ln[B]=-2.09+0.637*ln[DBH]	0.603
Quercus prinus	ln[B]=-1.31+0.528*ln[DBH]	0.577
Quercus rubra	ln[B]=-0.593+0.292*ln[DBH]	0.087

Table S2: Species-specific height regression equations

Species	Equations	r.2
Carya cordiformis	ln[H] = 0.332+0.808*ln[DBH]	0.874
Carya glabra	ln[H] = 0.685+0.691*ln[DBH]	0.841
Carya ovalis	ln[H] = 0.533+0.741*ln[DBH]	0.924
Carya tomentosa	ln[H] = 0.726+0.713*ln[DBH]	0.897
Fagus grandifolia	ln[H] = 0.708+0.662*ln[DBH]	0.857
Liriodendron tulipifera	ln[H] = 1.33+0.52*ln[DBH]	0.771
Quercus alba	ln[H] = 0.74+0.645*ln[DBH]	0.719
Quercus prinus	ln[H] = 0.41+0.757*ln[DBH]	0.886
Quercus rubra	ln[H] = 1.00+0.574*ln[DBH]	0.755
all	ln[H] = 0.839+0.642*ln[DBH]	0.857

Table S3: Palmer drought severity index (PDSI) by month for focal droughts

year	month	PDSI	rank
focal droughts			
1966	May	-2.98	2
	June	-3.40	2
	July	-4.08	2
	August	-4.82	1
1977	May	-2.96	3
	June	-3.28	3
	July	-3.61	3
	August	-3.68	3
1999	May	-3.63	1
	June	-4.21	1
	July	-4.53	1
	August	-4.64	2
other			
1991	May	-1.79	10
	June	-2.10	10
	July	-2.17	10
	August	-3.06	4

Table S4: Comparison of Rt and ARIMA Rt results, showing a sample of 7 trees. Full table can be found at THIS WEBSITE.

Year	Tree	Rt	Rt_ARIMA
1966	132018	0.66	0.59
1977	132018	0.66	0.71
1999	132018	0.92	0.81
1966	50488	1.48	0.65
1977	50488	0.39	0.34
1999	50488	0.90	0.65
1966	60059	0.79	0.95
1977	60059	0.72	0.78
1999	60059	0.78	0.73
1966	80625	0.79	0.82
1977	80625	0.52	0.55
1999	80625	0.74	1.00
1966	121105	0.86	0.85
1977	121105	1.05	1.15
1999	121105	0.71	0.82
1966	131113	0.79	0.83
1977	131113	0.75	0.79
1999	131113	1.05	1.02
1966	70256	0.80	0.73
1977	70256	0.75	0.79
1999	70256	0.83	1.04

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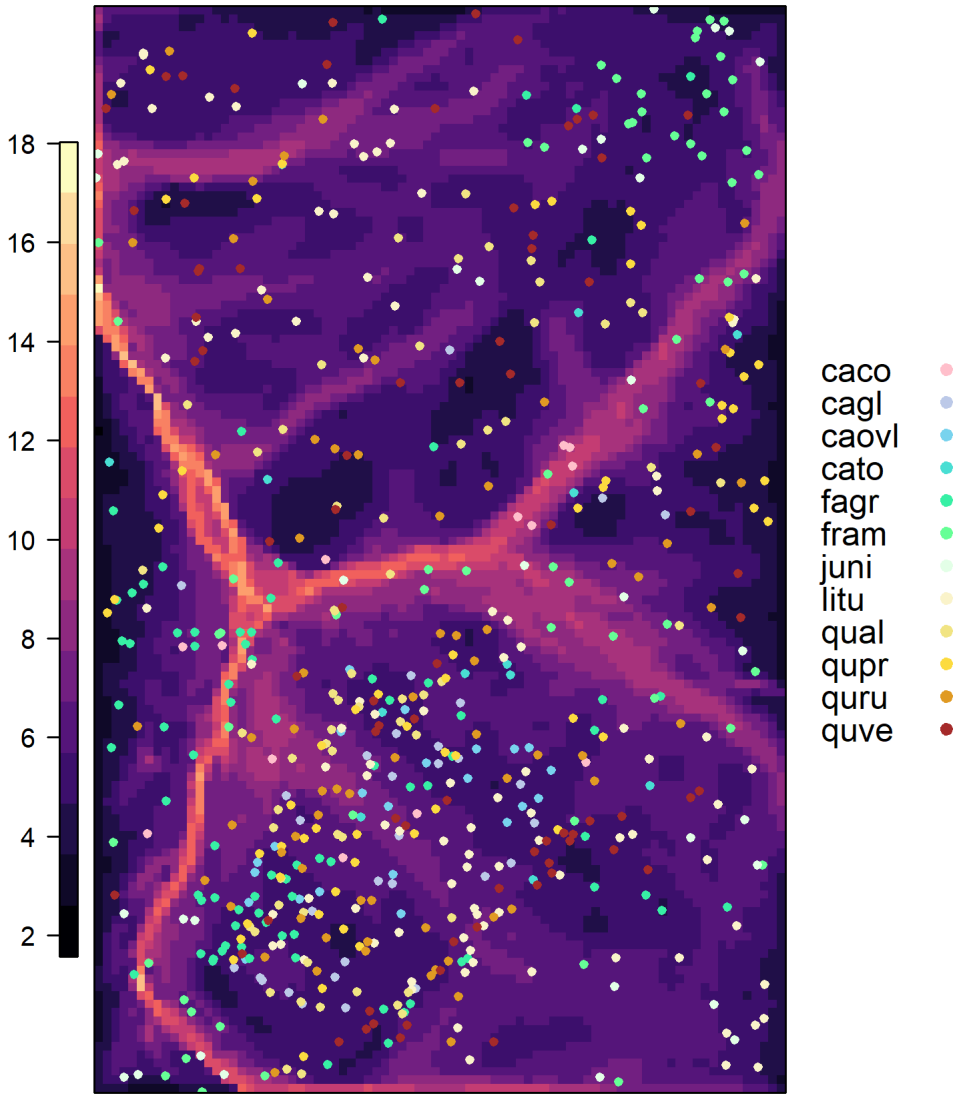

Figure S1: Map of ForestGEO plot showing TWI and location of cored trees

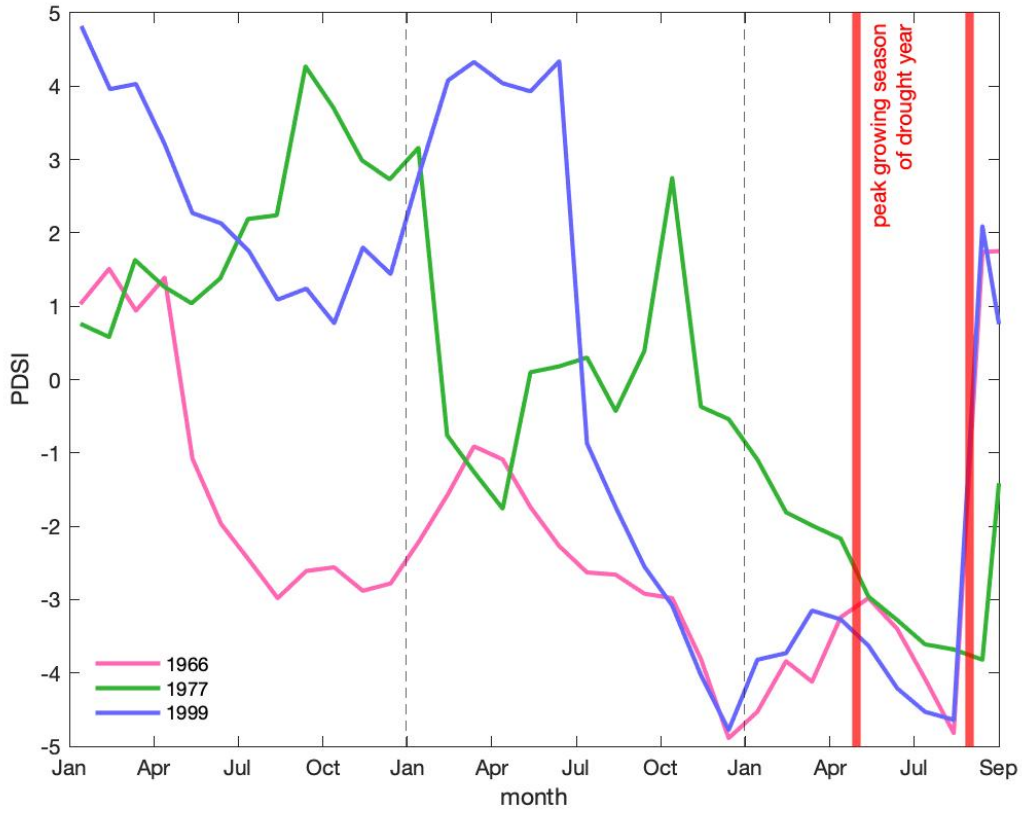

Figure S2: Time series of Palmer Drought Severity Index (PDSI) for the 2.5 years prior to each focal drought

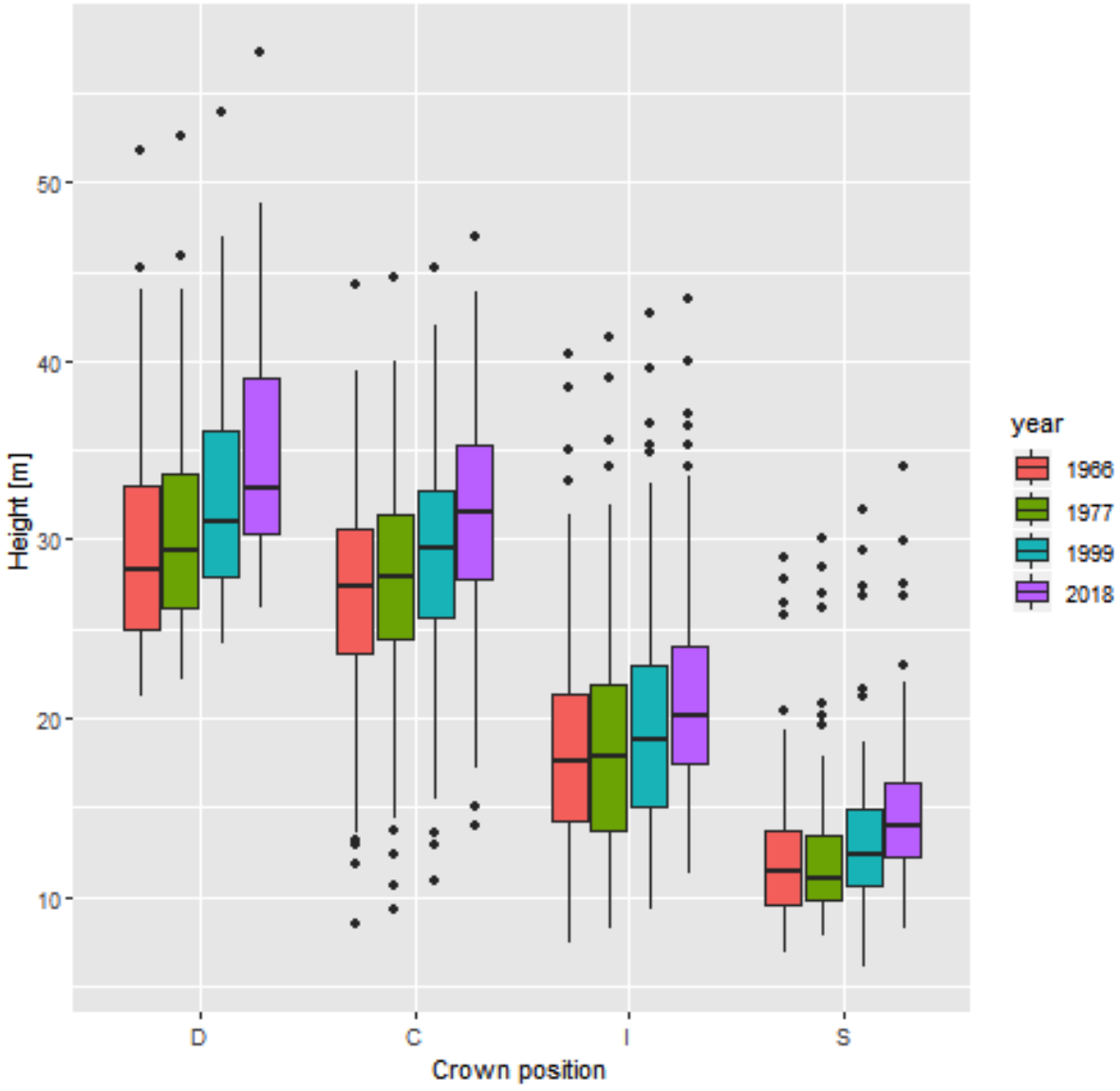

Figure S3: Height by canopy position across the three focal droughts and in the year of measurement (2018)

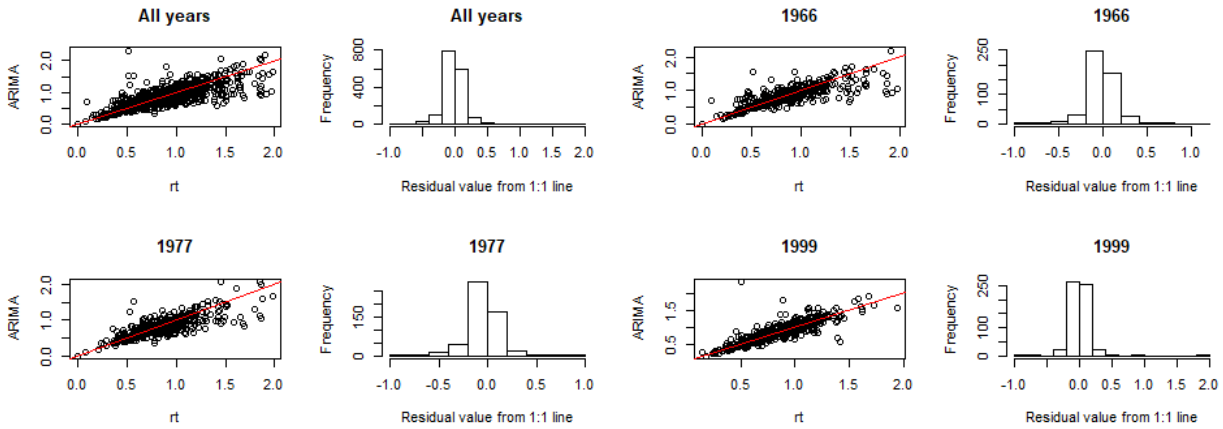

Figure S4: Comparison of Rt and ARIMA results, with residuals, for each drought scenario

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